AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended)   An IP address lookup system, comprising: a forwarding table which has a three-layer table architecture so that it can search for each address group that constitutes an IP destination address of an input packet; and a forwarding engine which obtains packet processing information and next hop information for the input packet by searching for the forwarding table using the IP destination address as a search key,

wherein the forwarding table comprises: a first table which is used for looking up eight most significant bits of the IP destination address; a second table which is used for looking up ninth through twentieth bits of the IP destination address; and a third table which is used for looking up twelve least significant bits of the IP destination address.

Claim 2 (Original)   The IP address lookup system of claim 1 being installed in an input interface unit or an output interface unit of a router.

Claim 3 (Original)   The IP address lookup system of claim 2, wherein the input interface unit comprises at least one input link interface including the forwarding table and the forwarding engine.

Claim 4 (Original)   The IP address lookup system of claim 2, wherein the output interface unit comprises at least one output link interface including the forwarding table and the forwarding engine.

Claim 5 (Original)   The IP address lookup system of claim 1 further comprising: a routing information collection and forwarding information generation unit which collects routing information using a routing protocol and processes the collected routing information into forwarding information; and a forwarding table management unit which stores the forwarding information in the forwarding table.

Claim 6 (Canceled)   .

Claim 7 (Currently Amended)   The IP address lookup system of ~~claim 6~~claim 1, wherein the first through third tables are updated when their respective forwarding entries are varied.

Claim 8 (Currently Amended)   The IP address lookup system of ~~claim 6~~claim 1, wherein the first table includes 2^8 32-byte entries.

Claim 9 (Original)   The IP address lookup system of claim 8, wherein the first table comprises: a valid bit which indicates whether or not each entry constituting the first table is valid; a first shift bit which indicates by how many bits the IP destination address is to be shifted to determine which bits of the IP destination address are to be compared with entries of the second table; and a second table offset bit which indicates an offset of a plurality of sub-tables of the second table from a start address.

Claim 10 (Original)   The IP address lookup system of claim 9, wherein the first table further comprises a flag bit which indicates whether or not an entry designated by the second table offset bit includes next hop information.

Claim 11 (Currently Amended)   The IP address lookup system of ~~claim 6~~claim 1, wherein the first table further comprises a final bit which indicates a table next to the first table is a last one.

Claim 12 (Original)   The IP address lookup system of claim 9, wherein when ShiftBits1 represents the first shift bit, the second table includes as many 4-byte entries as $2^{ShiftBits1}$ for each of the entries of the first table.

Claim 13 (Original)   The IP address lookup system of claim 12, wherein the second table comprises: a valid bit which indicates whether or not each entry constituting the second table is valid; a second shift bit which indicates by how many bits the IP destination address is to be shifted to determine which bits of the IP destination address are to be compared with entries

of the third table; and a second table offset bit which indicates an offset of a plurality of sub-tables of the third table from the first table.

Claim 14 (Original)   The IP address lookup system of claim 13, wherein when ShiftBits2 represents the second shift bit, the third table includes as many 16-byte entries as $2^{ShiftBits2}$ for each of the entries of the second table.

Claim 15 (Original)   The IP address lookup system of claim 14, wherein the third table comprises: a valid bit which indicates whether or not each entry constituting the third table is valid; an interface indicating bit which indicates interface information for each entry of the third table; and a fabric header which indicates a next hop media access control address and additional header information to be used by a switch fabric unit.

Claim 16 (Original)   The IP address lookup system of claim 1, wherein the forwarding engine comprises: a packet forwarding unit which searches the forwarding table for a forwarding entry corresponding to the IP destination address of the input packet and forwards the input packet by using next hop information and packet processing information provided by the searched forwarding entry; a protocol packet processing unit which processes an internal routing protocol; and an error processing unit which determines the input packet as an error packet and abandons the input packet if forwarding information is not set in the IP destination information.

Claim 17 (Original)   The IP address lookup system of claim 16, wherein the packet forwarding unit searches for an entry, which is a longest match for the IP destination address, using an IP longest prefix match method.

Claim 18 (Currently Amended)   An IP address lookup method, comprising: (a) extracting an IP destination address from an input IP data packet; (b) extracting entries of a first table corresponding to eight most significant bits of the IP destination address; (c) extracting entries of a second table corresponding to a result of shifting fourteen bits following the eight most significant bits of the IP destination address by as much as a first shift bit; (d) extracting

entries of a third table corresponding to a result of shifting twelve ~~most~~ least significant bits of the IP destination address by as much as a second shift bit; and (e) extracting next hop information and packet processing information from a searched entry of the third table, wherein the first through third tables constitutes a forwarding table which enables each address group of the IP destination address to be searched for.

Claim 19 (Original)   The IP address lookup method of claim 18, wherein the first through third tables are updated when their respective forwarding entries are varied.

Claim 20 (Original)   The IP address lookup method of claim 18, wherein in steps (b), (c), and (d), an entry, which is a longest match for the IP destination address, is searched for using an IP longest prefix match method.

Claim 21 (Original)   The IP address lookup method of claim 18, wherein the first table comprises: a valid bit which indicates whether or not each entry constituting the first table is valid; a first shift bit which indicates by how many bits the IP destination address is to be shifted to determine which bits of the IP destination address are to be compared with entries of the second table; and a second table offset bit which indicates an offset of a plurality of sub-tables of the second table from a start address.

Claim 22 (Original)   The IP address lookup method of claim 21, wherein when ShiftBits1 represents the first shift bit, the second table includes as many 4-byte entries as $2^{ShiftBits1}$ for each of the entries of the first table.

Claim 23 (Original)   The IP address lookup method of claim 22, wherein the second table comprises: a valid bit which indicates whether or not each entry constituting the second table is valid; a second shift bit which indicates by how many bits the IP destination address is to be shifted to determine which bits of the IP destination address are to be compared with entries of the third table; and a second table offset bit which indicates an offset of a plurality of sub-tables of the third table from the first table.

Claim 24 (Original)   The IP address lookup method of claim 23, wherein when ShiftBits2 represents the second shift bit, the third table includes as many 16-byte entries as $2^{ShiftBits2}$ for each of the entries of the second table.

Claim 25 (Original)   The IP address lookup method of claim 24, wherein the third table comprises: a valid bit which indicates whether or not each entry constituting the third table is valid; an interface indicating bit which indicates interface information for each entry of the third table; and a fabric header which indicates a next hop media access control address and additional header information to be used by a switch fabric unit.

Claim 26 (Original)   The IP address lookup method of any of claims 21, 23, and 25 further comprising: (f) abandoning the input IP data packet if the valid bit is determined as being invalid.

Claim 27 (Original)   A computer-readable recording medium on which a program enabling the method of claim 18 is recorded.